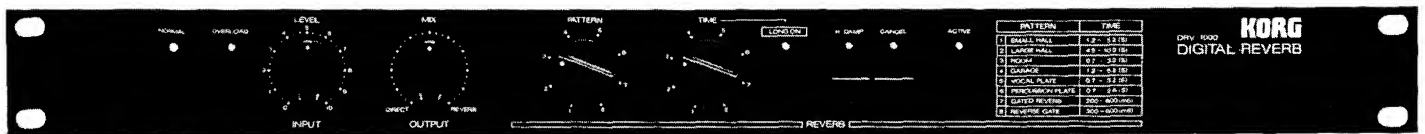


KORG®

DIGITAL REVERB

DRV-1000



SERVICE MANUAL

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KORG INC.
TOKYO/JAPAN

1. SPECIFICATIONS

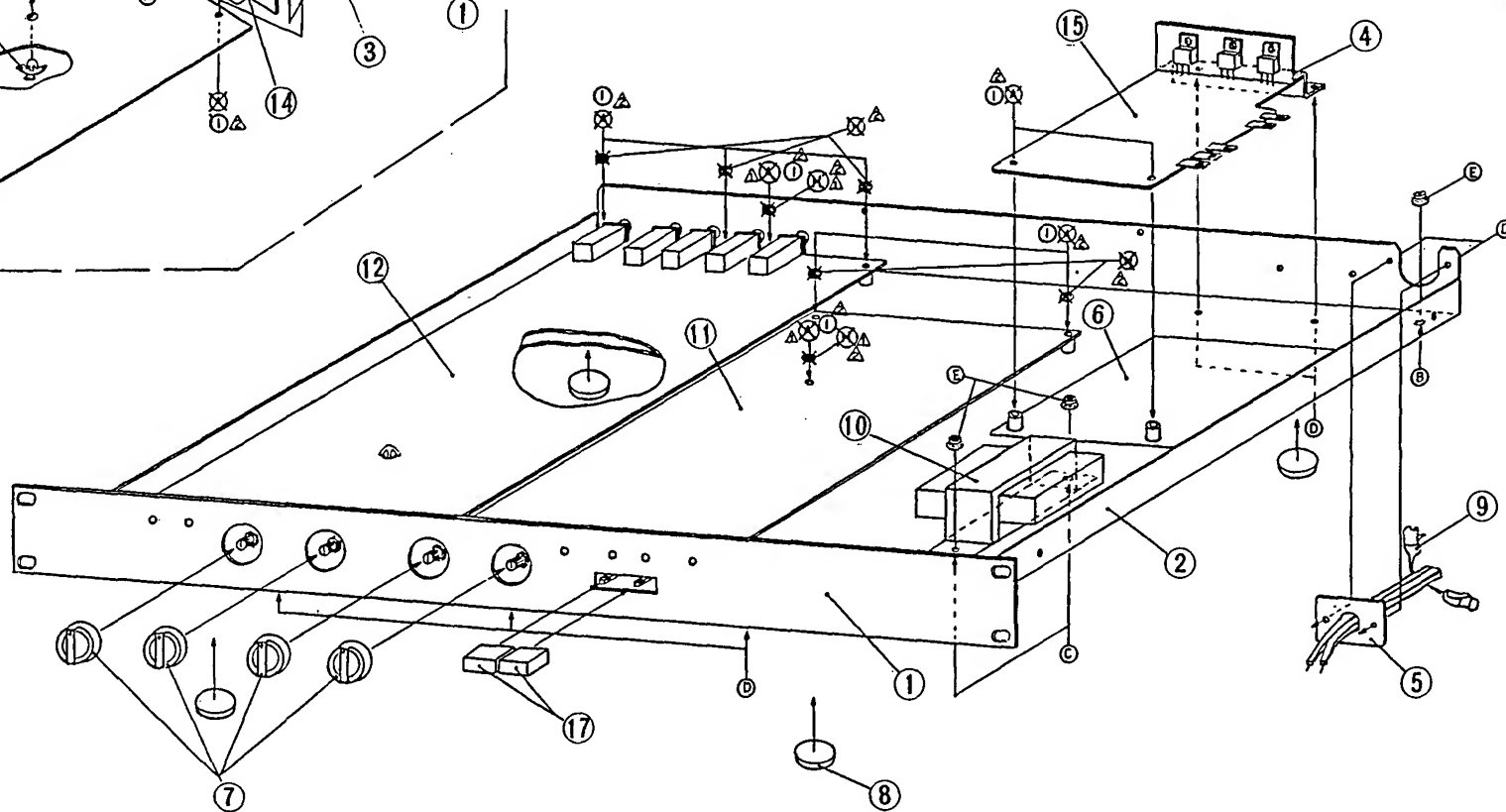
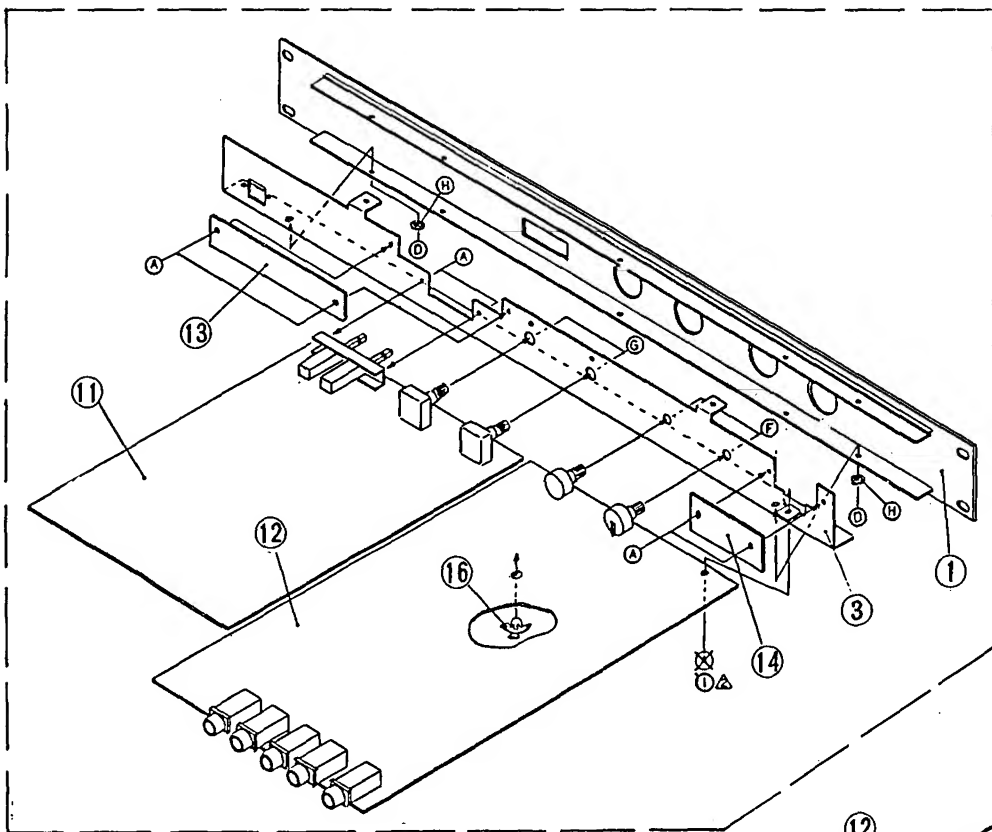
● Input	Input level	-20dBm	
	Impedance	10kΩ	
	Max. clip level	+5dBm	
● Output		MIX L ch	MIX R ch
	Output level	-10dBm	-10dBm
	Impedance	1kΩ	1kΩ
	Max. clip level	+5dBm	+5dBm
● Frequency response	Direct	20Hz ~ 20kHz, ±1dB	
	Reverb	20Hz ~ 10Hz, +1dB, -3dB	
● Dynamic range	Direct	95dB (IHF-A)	
	Reverb	80dB (IHF-A)	
● Distortion	Direct	0.01%	
	Reverb	0.05%	
● Quantization	16 bit A/D linear conversion (1 ch)		
	16 bit D/A linear conversion (2 ch)		
● Power supply	117V, 220V, or 240V 50/60Hz 7W		
● Dimension	482mm (W) x 290mm (D) x 44mm (H) 1U		
	19" (W) x 11.4" (D) x 1.7" (H) 1U		
● Weight	3.6 kg		
	7 lb 15-3/4 oz		

* Specifications subject to change without notice.

2. STRUCTURAL DIAGRAM

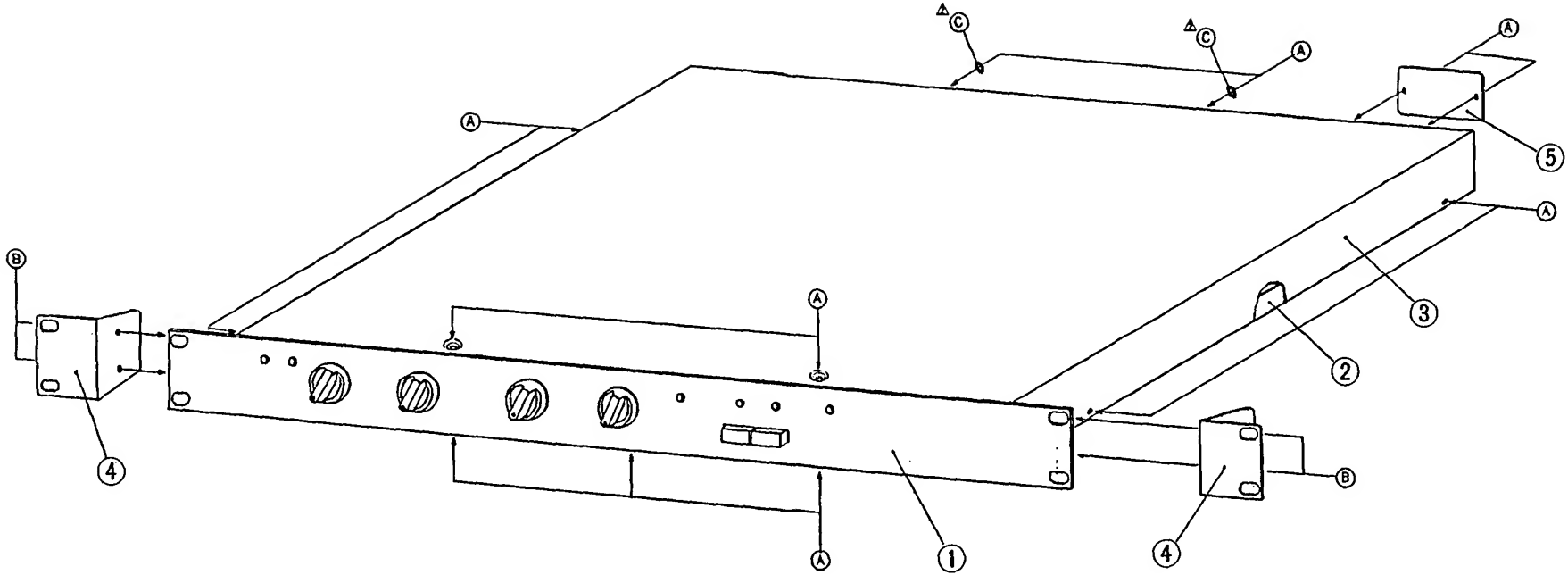
PART NO.	PART NAME	PART CODE
1	FRONT PANEL	64080700
2	CHASSIS	64080400
3	FRONT CHASSIS	64080600
4	HEAT SINK	64063800
5	BUSHING PLATE	
6	SHIELDING PLATE	63000300
7	KNOB	62017600
8	RUBBER FEET	50008700
9	BUSHING	
10	POWER TRANSFORMER	
11	P.C. BOARD KLM-839	34083900
12	P.C. BOARD KLM-840	34084000
13	P.C. BOARD KLM-841	34084000
14	P.C. BOARD KLM-842	34084000
15	P.C. BOARD KLM-843	34084300
16	SUPPORT SPACER	54008700
17	PUSH SW KNOB	62017700

PART NO.	SCREWS, NUTS & WASHERS	Q'TY
A	FE B ZMC 3x6	16
B	FE B ZMC 4x8	1
C	FE B BZMC 4x10	2
D	TP2G B BZMC 3x8	7
E	FHN ZMC 4	3
F	VN ZMC 7	2
G	VN ZMC 9	2
H	TWU ZMC 3	9

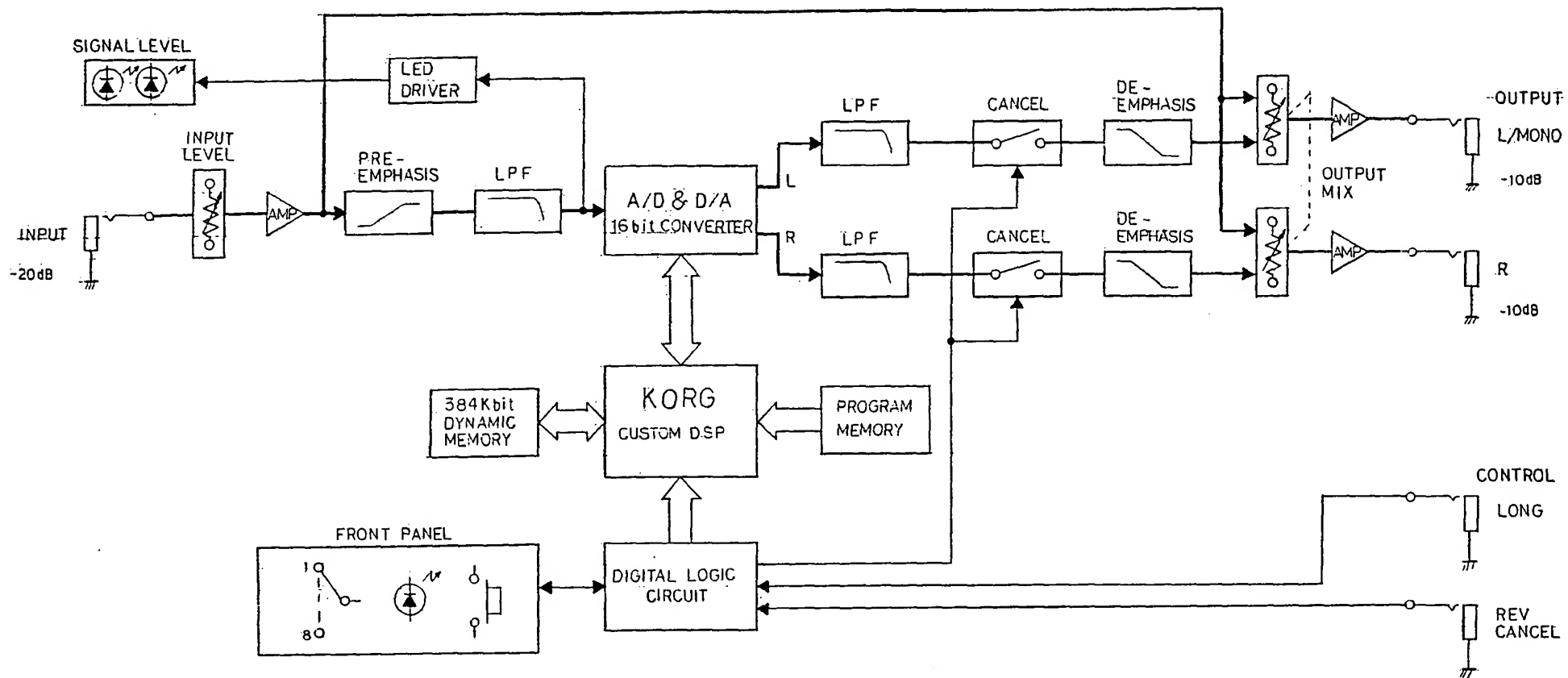


PART NO.	SCREWS & WASHER	Q'TY
A	TP2G B BZMC 3x6	13
B	FE F BZMC 3x8	4
C	TWU ZMC 3	2

PART NO.	PART NAME	PART CODE
1	FRONT PANEL	64080700
2	CHASSIS	64080400
3	COVER	64080500
4	FRONT PANEL BOARD	64063700
5	NAME PLATE	68600700

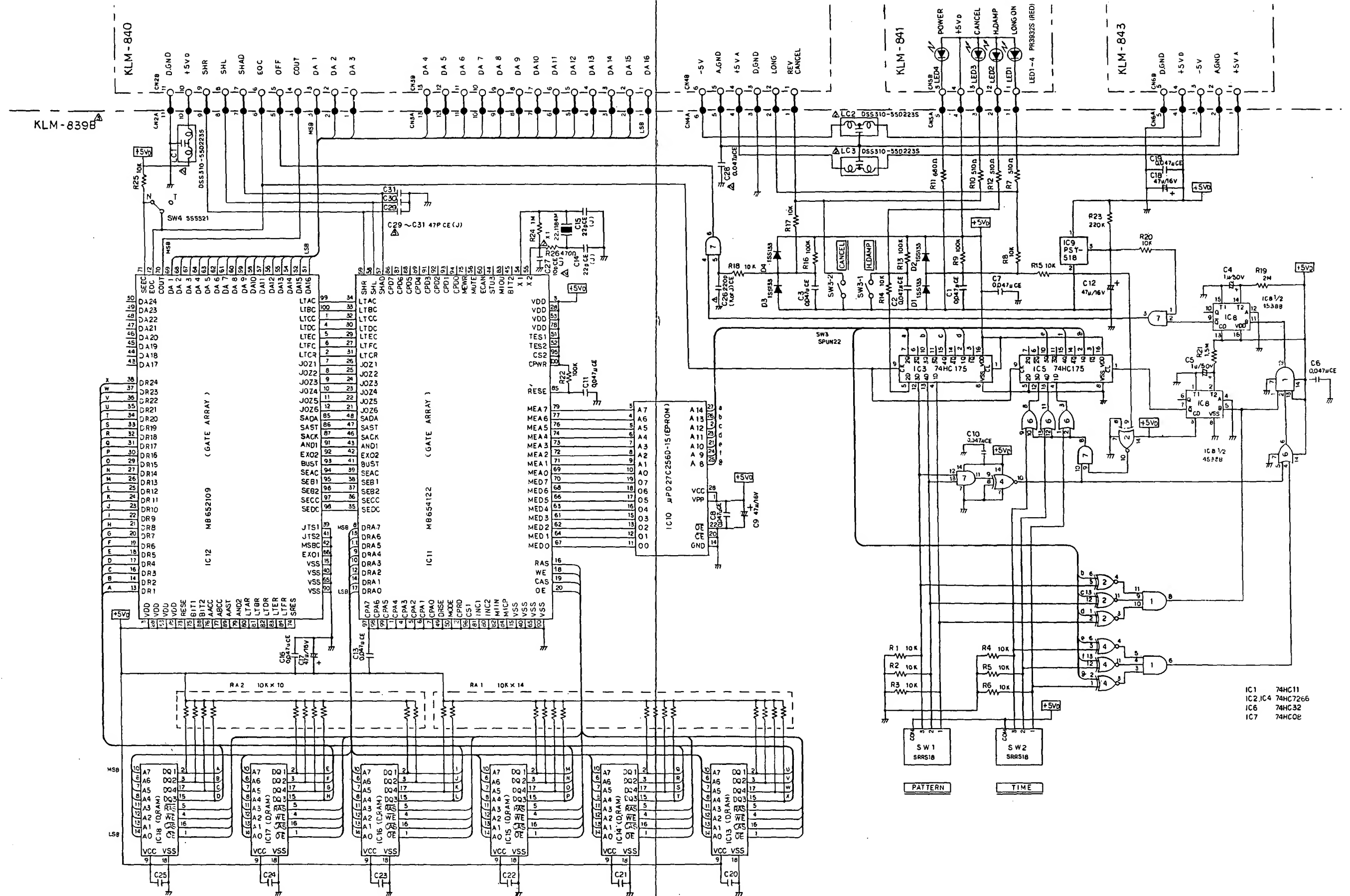


3. BLOCK DIAGRAM



4. CIRCUIT DIAGRAM

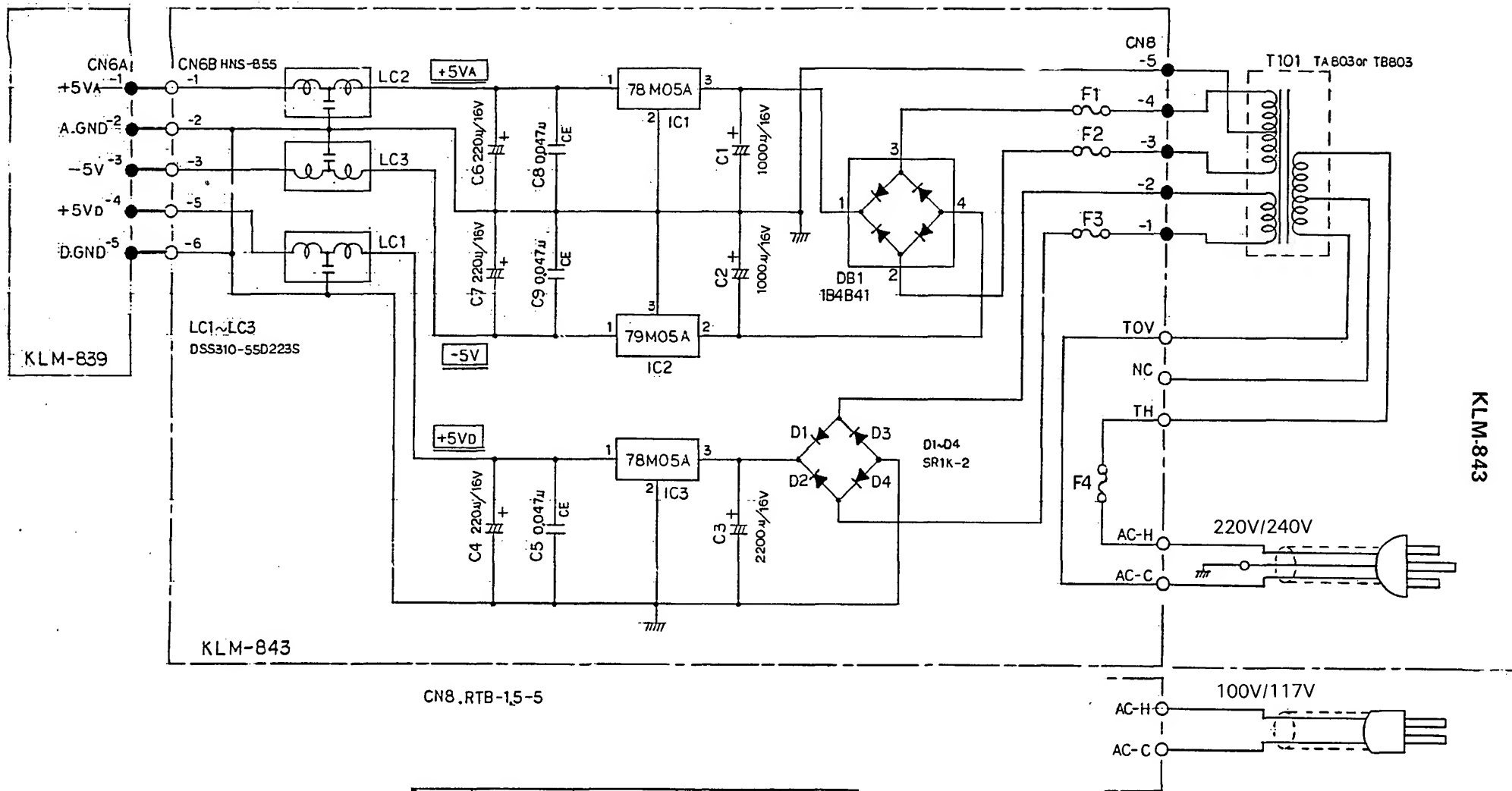
KLM-839



C20 ~ C25; 0.047 μ C
IC13 ~ IC18; MB81416-15 OR M5M4416P-15

KLM-840 | | KLM-842



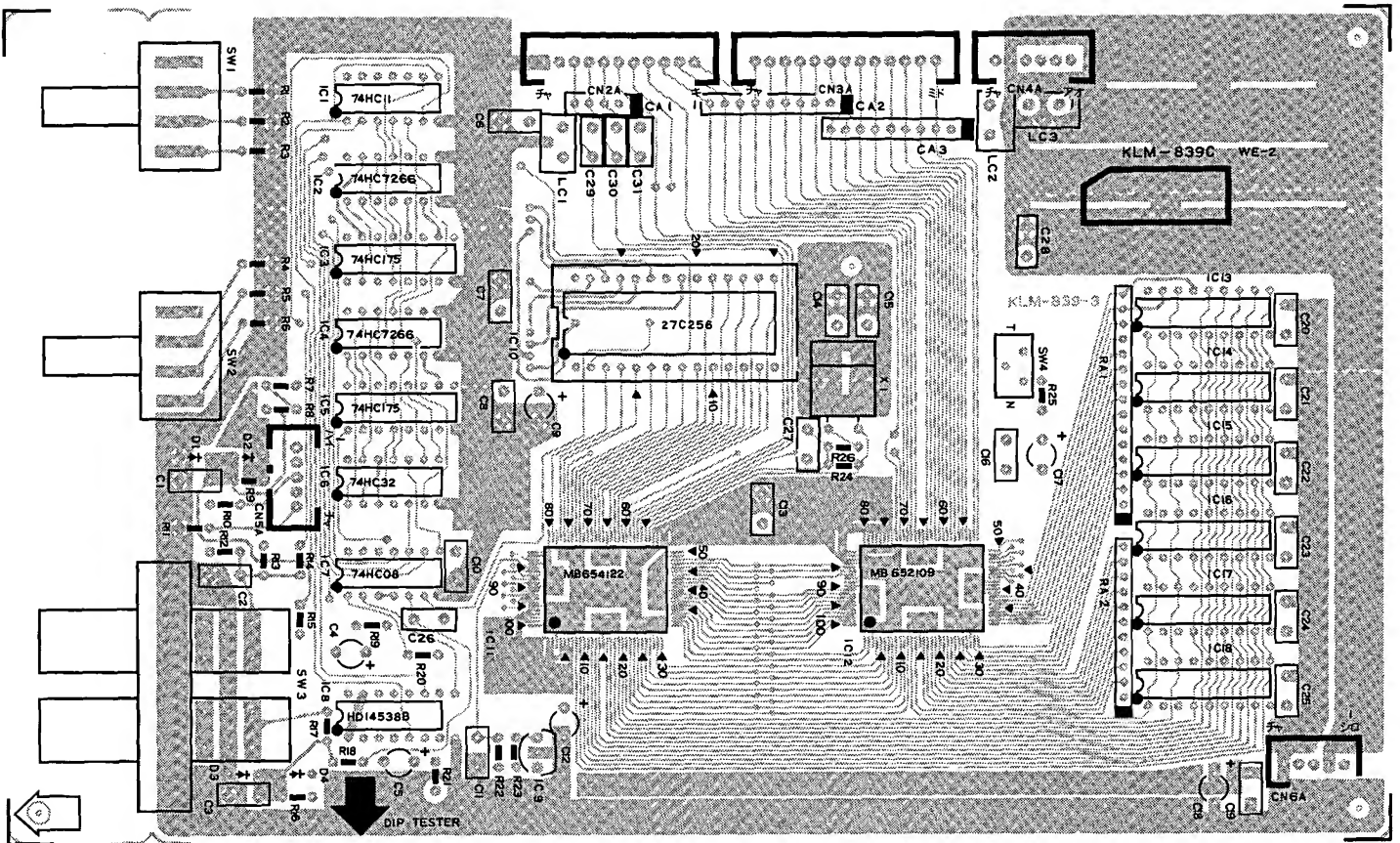


	F1, F2	F3	F4	T101
100V	250V 0.5A	250V -- 1A	250V 0.4A	TA803
117V				
220V	250VT250mA	250VT500mA	250VT125mA	TB803
240V				

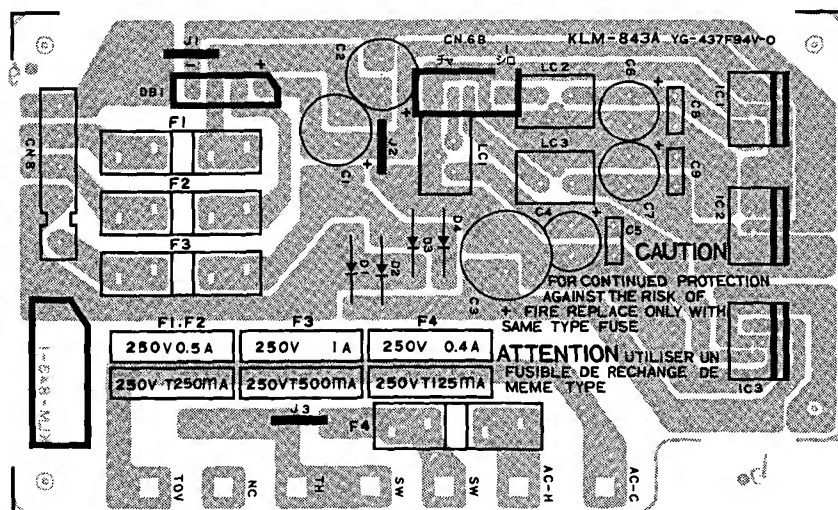
KLM-840/841/842



KLM-839



KLM-843



6. SYSTEM EXPLANATION

1. PCB CONSTRUCTION

This digital reverb DRV-1000 is designed very compact, and consists of following 3 PCBs.

1) Analog PCB KLM-840

As shown in the circuit diagram, the main circuitries are; PRE-EMPHASIS, DE-EMPHASIS, LOW PASS FILTER, SAMPLE/HOLD, COMPUTER and DAC.

2) Digital PCB KLM-839

Process vocal data by the custom gate array.

3) Power PCB KLM-843

Supply $\pm 5V$. to the analog circuit, and +5V. to the digital circuit.

2. REVERB PATTERN/TIME SETTINGS

PATTERN NUMBER	PATTERN	TIME NUMBER							
		1	2	3	4	5	6	7	8
1	SMALL HALL	0.7s	1.2s	1.8s	2.4s	3.0s	3.6s	4.4s	5.2s
2	LARGE HALL	1.2s	1.8s	2.1s	2.6s	3.4s	4.6s	7.0s	10.0s
3	ROOM	0.20s	0.23s	0.26s	0.29s	0.31s	0.34s	0.37s	0.40s
4	GARAGE	0.7s	0.9s	1.2s	1.5s	1.8s	2.2s	2.6s	3.2s
5	VOCAL PLATE	0.7s	1.0s	1.3s	1.7s	2.0s	2.3s	2.7s	3.4s
6	INSTRUMENTS PLATE	0.7s	0.9s	1.1s	1.3s	1.6s	1.8s	2.1s	2.6s
7	GATED REVERB	150ms	180ms	220ms	260ms	290ms	320ms	360ms	400ms
8	REVERSE	150ms	180ms	210ms	240ms	270ms	290ms	320ms	350ms

Pattern/time data indicated in above table are stored in a 256Kbit EPROM on KLM-839, and by the combinations of the patterns (1 - 8), time (1 - 8) and H. DAMP ON/OFF, the upper address is determined and accordingly 128 ways of the effects will be gained in total.

Following is setting logic of the patterns and the time switches against the address of the EPROM.

	P1	P2	P3	P4	P5	P6	P7	P8	T1	T2	T3	T4	T5	T6	T7	T8
A 8	L	L	L	L	L	L	L	L	L	H	L	H	L	H	L	H
A 9	L	L	L	L	L	L	L	L	L	L	H	H	L	L	H	H
A10	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H
A11	L	H	L	H	L	H	L	H	L	L	L	L	L	L	L	L
A12	L	L	H	H	L	L	H	H	L	L	L	L	L	L	L	L
A13	L	L	L	L	H	H	H	H	L	L	L	L	L	L	L	L
A14	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H

Note: 1 P = Pattern, T = Time

2 When the H. DAMP is on, A14 must be all "L" regardless of the switch settings.

3 At the LONG ON setting, A8 - A10 except PATTERN 7 & 8 (with GATED REVERB and REVERB) should be "H".

3. OUTLINE OF GATE ARRAY

The DRV-1000 has adopted two newly developed GATE ARRAYS. We give an explanation on the each array here.

1) MB652109

This gate array consists of SAR (Successive Approximation Resistor), reverberation process circuit (resistors of 24 bit, adder, multiplier of 24 bit x 6 bit) and BUS circuit for outer memory.

Main function here is calculation of vocal data.

Following are the functions of each terminal.

TERMINAL NAME	INPUT/OUTPUT	FUNCTION
DA1 ~ DA16	O	DATA OUTPUT TERMINAL OUTPUT to DAC
COUT	I	DATA INPUT TERMINAL INPUT from the comparator
EOC	O	Selection/control signal output of A/D terms or D/A terms
SEEC	I	Internal Selector terminal TEST: Made for direct output of A/D data to D/A NORMAL: To output internally processed data during the D/A period according to the EOC signal
DR1 ~ DR24	I/O	IN/OUTPUT terminal for 24 bit vocal data, and the data bus among the DRAMs (IC13-18) on KLM-839.
LTAC ~ SEDC	I	Input terminal of control signals for calculation sent from MB654122

2) MB654122

This LSI holds a function to output all the necessary timing/control signals for calculation in accordance with the panel operations such as PATTERN, TIME settings and etc. The functions of each terminal are as follows.

TERMINAL NAME	INPUT/OUTPUT	FUNCTION
x1 x2	I O	Generation of 22MHz SYSTEM CLOCK by operating the crystal oscillator
SHAD, SHL, SHR	O	Output the control signals for sample/hold
LTAC ~ SEDC	O	8 patterns x 8 times x 2 H. DAMP ON/OFF Output terminal for process patterns
DRA0 ~ DRA7	O	Address output terminal for DRAM
RAS, CAS, WE, OE	O	Control signal output terminal in DRAM READ/WRITE
MED0 ~ MED7	I	Input terminal for panel switch data
MEA0 ~ MEA7	O	Address output terminal to EPROM
RESE	I	Input terminal for internal counter reset

4. MEMORY CONSTRUCTION

To memorize 24 bit data for operation, 6 Dynamic RAMs of 16K x 4 bit compose the memory.

7. ADJUSTMENT PROCEDURE

N. B.

This product is perfectly adjusted in the factory before the shipment.

Do not touch the trimmer unless repair or further adjustment is required.

D/A, A/D OFFSET ADJUSTMENT (KLM-840)

1. SETTING

INPUT LEVEL	OUTPUT LEVEL	PATTERN	TIME	INTERNAL TEST SW
0	*	*	*	T

(NOTE)

T ; TEST MODE

N ; NORMAL MODE

* ; Free setting

2. ADJUSTMENT PROCEDURE

1) Connect an oscilloscope (DC 0.5V/div, 2 μ s/div) to TP1 on the KLM-840. Both GNDs have to be also connected.

2) Confirm whether the waveform on the oscilloscope is the good shape or not referring to the chart below.

3) In case it does not show any regular waveform, please adjust with VR3.

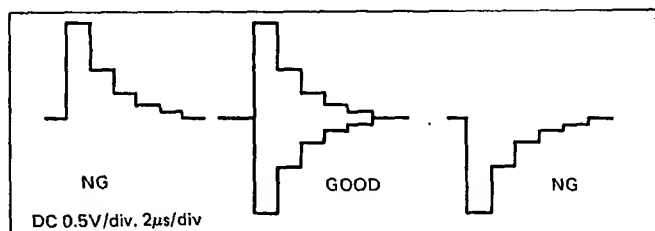


Fig-1

NOTE:

Trigger from TP2 (IC9 PIN 9) will be synchronized on the oscilloscope by connecting to its EXT TRIG IN, and which simplify the measurement of the waveforms.

If it is not properly adjusted, noises may occur in changing the LONG ON.

8. PARTS LIST

PARTS CODE	PARTS NAME SPECIFICATIONS	P.C. BOARD	IDENTIFICATION NO. FUNCTION	Q'TY
CARBON RESISTORS				
10009000	1/4Y 0Ω	KLM-843		3
10416000	1/6JTP 0Ω	KLM-840		13
10416310	1/6JTP 100Ω			1
10416347	1/6JTP 470Ω	KLM-839		1
10416351	1/6JTP 510Ω			3
10416368	1/6JTP 680Ω			1
10416410	1/6JTP 1.0K	KLM-840		4
10416420	1/6JTP 2.0K			7
10416447	1/6JTP 4.7K			1
10416451	1/6JTP 5.1K			6
10416475	1/6JTP 7.5K			6
10416510	1/6JTP 10K	KLM-839		13
		KLM-840		6
10416511	1/6JTP 11K			3
10416513	1/6JTP 13K			3
10416516	1/6JTP 16K			6
10416520	1/6JTP 20K			6
10416522	1/6JTP 22K			4
10416524	1/6JTP 24K			2
10416533	1/6JTP 33K			3
10416547	1/6JTP 47K			5
10416568	1/6JTP 68K			2
10416582	1/6JTP 82K			1
10416610	1/6JTP 100K	KLM-839		4
10416622	1/6JTP 220K			1
10416710	1/6JTP 1.0M			1
		KLM-840		1
10416715	1/6JTP 1.5M	KLM-839		1
10416720	1/6JY 2.0M			1
METAL FILM RESISTORS				
12514511	1/6 5.11K	KLM-840		2
12515150	1/6 15.0K			2
12516100	1/6TP 100K			1
BLOCK RESISTORS				
13510510	RKC1/8B10J 10K	KLM-839		1
13514510	RKC1/8B14J 10K			1
MYLAR CAPACITORS				
20401410	50V 0.001μF	KLM-840		16
20401422	50V 0.0022μF			3
20401456	50V 0.0056μF			3

PARTS CODE	PARTS NAME SPECIFICATIONS	P.C. BOARD	IDENTIFICATION NO. FUNCTION	Q'TY
20401556	50V 0.056μF	KLM-840		3
CERAMIC CAPACITORS				
21355470	50V 0.047μF	KLM-843		3
21451300	50V 3pF TP	KLM-840		1
21452100	50V 10pF TP	KLM-839		1
21452220	50V 22pF TP			2
21452470	50V 47pF TP			3
21453220	50V 220pF TP			1
		KLM-840		1
21455100	50V 0.01μF TP			2
21455470	50V 0.047μF TP	KLM-839		18
		KLM-840		5
EMI FILTERS				
21950100	DSS310-55D223S	KLM-839		3
		KLM-840		2
		KLM-843		3
ELECTROLYTIC CAPACITORS				
23507410	16V 1000μF	KLM-843		2
23507422	16V 2200μF			1
23547322	16V 220μF			3
25402247	10V 47μF	KLM-839		4
		KLM-840		1
25402310	10V 100μF			3
25402322	10V 220μF			1
25404147	25V 4.7μF			11
25404210	25V 10μF			17
25406110	50V 1μF	KLM-839		2
		KLM-840		4
25464147	25V 4.7μF			1
PPCs				
26403322	100V 220pF	KLM-840		3
DIODES				
31001500	SR1K-2	KLM-843		4
31401300	1SS-133	KLM-839		4
		KLM-840		2

PARTS CODE	PARTS NAME SPECIFICATIONS	P.C. BOARD	IDENTIFICATION NO. FUNCTION	Q'TY
BRIDGE DIODE				
31010100	1B4B41	KLM-843		1
LEDs				
31201400	PR 3932S	KLM-841 KLM-842		4 1
31206800	PG3932SY			1
ICs				
32001069	74HC32C	KLM-839		1
32001086	μPD41416C-12			6
32001101	74HC08C			1
32001123	μPD27C256D-15			1
32001124	μPD74HC11C			1
32004039	HD-14053BP	KLM-840		3
32004113	HD14538BP	KLM-839		1
32004114	HD74HC175P			2
32004115	HD74HC7266P			2
32007023	BA6124	KLM-840		1
32009001	NJM-4558D-V			7
32009012	NJM-311D			1
32009022	NJM-4558D-D			1
32009032	NJM-78M05A	KLM-843		2
32009054	NJM79M05			1
32012032	MB652109PF C5000AV	KLM-839	Gate array	1
32012033	MB654122PF 2600AV		Gate array	1
32013001	PST-518			1
32021011	TL-072	KLM-840		2
32036001	PCM54HP			1
CERAMIC OSCILLATOR				
33504300	HC-49/μ 22.1184MHz	KLM-839		1
P.C. BOARDS				
34083900	KLM-839	KLM-839		1
34084000	KLM-840/841/842	KLM-840		1
34084300	KLM-843	KLM-843		1
SEMI FIXED VR				
35003310	RH0621C14J 10K	KLM-840		1

PARTS CODE	PARTS NAME SPECIFICATIONS	P.C. BOARD	IDENTIFICATION NO. FUNCTION	Q'TY
VRs				
36020200	RK1631110RGXA 20KB	KLM-840		1
36020300	RK16312AOAHQA 20KBX2			1
ROTARY SWs				
37003400	SRRS18006A	KLM-839		2
SLIDE SW				
37306200	SSSS212A	KLM-839		1
PUSH SW				
37509000	SPUN22099A	KLM-839		1
POWER TRANSFORMERS				
40010500	TA-803		117 US 100 JP 117 EX 117 CN	1 1 1 1
40010600	TB-803		220 GE 220 SE 240 AF 240 AU 240 GE 220 WG 220 FR 240 UK 220 SC	1 1 1 1 1 1 1 1 1
PHONE JACKS				
45404300	YKB21-5012	KLM-840		5
FUSES				
46411601	250V 0.4A UL		117 US 100 JP 117 EX 117 CN	1 1 1 1
46411701	250V 0.5A UL		117 US 100 JP 117 EX 117 CN	2 2 2 2

PARTS CODE	PARTS NAME SPECIFICATIONS	P.C. BOARD	IDENTIFICATION NO. FUNCTION	Q'TY
46412003	250V 1.0A UL		117 US	1
			100 JP	1
			117 EX	1
			117 CN	1
46461101	250V T125MA		220 GE	1
			220 SE	1
			240 AF	1
			240 AU	1
			240 GE	1
			220 WG	1
			220 FR	1
			240 UK	1
			220 SC	1
46461401	250V T250MA		220 GE	2
			220 SE	2
			240 AF	2
			240 AU	2
			240 GE	2
			220 WG	2
			220 FR	2
			240 UK	2
			220 SC	2
46461701	250V T500MA		220 GE	1
			220 SE	1
			240 AF	1
			240 AU	1
			240 GE	1
			220 WG	1
			220 FR	1
			240 UK	1
			220 SC	1
HARNESSES				
47095000	HNS-850	KLM-842		1
47095100	HNS-851	KLM-840		1
47095200	HNS-852			1
47095300	HNS-853			1
47095400	HNS-854	KLM-841		1
47095500	HNS-855	KLM-843		1
47095600	HNS-856	KLM-840		1
CONNECTOR TOPS				
47130300	B3B-XHA	KLM-840		1
47130500	B5B-XHA	KLM-839		2
47130600	B6B-XHA			1
47131100	B11B-XHA			1

PARTS CODE	PARTS NAME SPECIFICATIONS	P.C. BOARD	IDENTIFICATION NO. FUNCTION	Q'TY
47131300	B13B-XHA	KLM-839		1
BASE PIN				
47407301	RTB-1.5-5	KLM-843		1
IC SOCKET				
48001282	28P DICA-28CTI	KLM-839		1
RUBBER FEET				
50008700				4
FUSE HOLDERS				
51502300	S-N5057 #01	KLM-843		8
BUSHINGS				
54000300	SR-4K-4		117 US	1
			100 JP	1
			117 EX	1
54000400	SR-5P-4		240 AU	1
54000500	SR-6W-1		220 GE	1
			220 SE	1
			240 AF	1
			240 GE	1
			220 WG	1
			220 FR	1
			240 UK	1
			220 SC	1
54000501	SR-6N3-4		117 CN	1
TEST PIN				
54007100	LC-2-G-YELLOW	KLM-840		1
WIRE BANDS				
54007200	PLT-1M			2
ISOLATING WASHER				
54007300	B-1725K	KLM-843		1

PARTS CODE	PARTS NAME SPECIFICATIONS	P.C. BOARD	IDENTIFICATION NO. FUNCTION	Q'TY
CORD BAND				
54007600	NO. 113 BLACK			1
SUPPORT SPACER				
54008700	PS-3NS			1
RADIATION SHEET				
56500300	BFG-30	KLM-843		1
SPACERS				
57504600	TYPE X NO. 10 L=11.5	KLM-841		4
		KLM-842		2
GND SEALS				
58001900			220 GE	1
			220 SE	1
			240 AF	1
			240 AU	1
			240 GE	1
			220 WG	1
			220 FR	1
			240 UK	1
			220 SC	1
WIRING CAUTION				
58004000	LARGE NO. 1		240 UK	1
AC CORDS				
60000102	KE-1044B PVC. 75		100 JP	1
60000201	SPT-2 18AWG SU426-58		117 US	1
60000301	CLASS1 (SU429-58)		117 EX	1
			220 GE	1
			240 GE	1
			220 WG	1
			240 UK	1
			220 SC	1
60000401	SAA (SU428-58) 3X.75		240 AU	1
60000501	BS PLUG (SU431A-58)		240 AF	1
60000901	SEV (SU430-58)		220 SE	1
60001301	KP-4819D GTCE-3.75		220 FR	1
60002000	SJT (SU338-56) 18/3MM		117 CN	1

PARTS CODE	PARTS NAME SPECIFICATIONS	P.C. BOARD	IDENTIFICATION NO. FUNCTION	Q'TY
KNOBS				
62017600 62017700	UE202011 FOR SPUN			4 2
SHIELDING PLATE				
63000300				1
FRONT PANEL BOARDS				
64063700				2
HEAT SINK				
64063800		KLM-843		1
BUSHING PLATES				
64064110	NO. 3		117 US 220 GE 220 SE 240 AF 240 AU 240 GE 220 WG 100 JP 117 EX 220 FR 240 UK 220 SC 117 CN	1 1 1 1 1 1 1 1 1 1 1 1 1 1
64064120	NO. 4			
CHASSIS				
64080400				1
COVER				
64080500				1
FRONT CHASSIS				
64080600				1

PARTS CODE	PARTS NAME SPECIFICATIONS	P.C. BOARD	IDENTIFICATION NO. FUNCTION	Q'TY
FRONT PANEL				
64080700				1
LUGS				
67200201	4PHY N3		220 GE	1
			220 SE	1
			240 AF	1
			240 GE	1
			220 WG	1
			220 FR	1
			240 UK	1
			117 CN	1
			220 SC	1
SERIAL NO. SEAL				
68599999				1
NAME PLATES				
68600700			117 US	1
			220 GE	1
			220 SE	1
			240 AF	1
			240 AU	1
			240 GE	1
			220 WG	1
			117 EX	1
			220 FR	1
			240 UK	1
			117 CN	1
GUARANTEE SEAL				
68602500			100 JP	1
SCREWS				
70160308	FE F BZMC 3X8	KLM-843		4
70530306	FE B ZMC 3X6			16
70530308	FE B ZMC 3X8			5
70530408	FE B ZMC 4X8			1
70560308	FE B BZMC 3X8			4
70560408	FE B BZMC 4X8			3
72560308	TP2G B BZMC 3X8			19

PARTS CODE	PARTS NAME SPECIFICATIONS	P.C. BOARD	IDENTIFICATION NO. FUNCTION	Q'TY
NUTS				
77030400	FHN ZMC 4	KLM-843		3
77130300	HN1 ZMC 3			3
WASHERS				
78430300	TWU ZMC 3		220 GE	11
78430400	TWU ZMC 4		220 SE	1
			240 AF	1
			240 GE	1
			220 WG	1
			220 FR	1
			240 UK	1
			117 CN	1
			220 SC	1

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